

Proceratium melinum (Roger, 1860) (Hymenoptera: Formicidae) in Romania: a new record of the species after a century

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Abstract

Proceratium melinum (Roger, 1860) is a hypogaecic ant species that occurs in southern Europe. Very little is known about the ecology and the distribution of this ant. In Romania there have been only two previous records from almost a century ago. We present a new record of this species and some insights regarding its ecology.

Keywords: hypogaecic ants, distribution, Europe, habitat requirements.

Introduction

Proceratium ants are mostly hypogaecic (subterranean), specialized predators on spider eggs and other arthropods (Brown, 1958 a, b, 1974, 1980; Dietrich, 2004; Fisher, 2005). *Proceratium melinum* (Roger, 1860) is one of the three species of this genus that occurs in Europe. The known distribution of *P. melinum* includes: Albania, Austria, Bulgaria, Croatia, Czech Republic, France, Greece, Hungary, Italy, Israel, Malta, Macedonia, Montenegro, Romania, Russia, Slovenia, Spain, Turkey and Ukraine (Fig. 1, see supplementary material for references). With the exception of this distributional information and some aspects regarding its biology, the species is unstudied.

The checklist of the Romanian ant fauna contains 109 species (Markó et al. 2006; Czechowski et al. 2012; Czekes et al. 2012). However, considering the geographical location of Romania and the greater number of known ant species from neighboring countries, Romania's ant fauna is likely under sampled (Czechowski et al. 2012). Moreover, data is particularly scarce for cryptic, sub-Mediterranean and parasitic ant species (Markó

et al. 2006; Markó, 2008). Currently six ant species with cryptic lifestyles are known to occur in Romania: *Cryptopone ochracea* (Mayr, 1855), *Hypoponera punctatissima* (Roger, 1859), *Ponera coarctata* (Latreille, 1802), *P. testacea* Emery, 1895, *Pyramica baudueri* (Emery, 1875) and *Proceratium melinum*. Except *Ponera coarctata* (see Csósz, 2003, Markó et al., 2006), these species have been collected from only a few sites. *Pyramica baudueri* is known from Arad County (Markó, 2008), whereas *Hypoponera punctatissima* was sampled in the surroundings of Bucharest (Paraschivescu, 1974). *Cryptopone ochracea* is known from Bucharest (Montandon and Santschi, 1910) and Băile Herculane (Csósz, 2003). Finally, *Ponera testacea* is known from five sites: Bucharest (Montandon and Santschi, 1910), Deva, Sibiu and Cluj-Napoca (Csósz and Seifert, 2003) and Arad County (Markó, 2008).

Despite being reported from southern Europe, the distribution and biology of *P. melinum* are poorly known. In Romania, probably due to its cryptic lifestyle and the lack of appropriate collection methods, the species



Fig.1: The known distribution of *Proceratium melinum* in Europe (red circles - published literature, blue square – new record).

was previously recorded only from two localities: Comana Vlasca (one worker–Montandon and Santschi, 1910) and Bucharest (two queens, collected in 1897 – Lomnicki, 1922). Herein we report a new record for *P. melinum*.

Materials and Methods

One worker (Figs. 2-5) and one queen (Fig. 6) of *Proceratium melinum* (Roger, 1860) were collected by pitfall traps during a myrmecological survey in Mlaștinile Satchinez Nature Reserve (Fig. 1, N 45.937706, E 21.036433, ca. 90 m a.s.l., Timiș County, Western Romania) on 12.09.2012. The species is easy to distinguish from other ant species in Romania, due to obvious morphological characters of the genus: a large and vaulted abdomen, with the tergite of the second abdominal segment strongly arched so that the

rest of the segments are pointed anteriorly, a dentate mandible and the apically incrassate funiculus (Onoyama and Yoshimura, 2002; Csősz, 2003). The specimens are deposited in the Natural History Museum of the Brukenthal National Museum, Sibiu, Romania. In addition, a distribution map was compiled based on the available data (precise published records of the species – see supplementary material). However, in some cases, collecting sites were identified only as larger areas (e.g. mountain or steppe). Thus, the map of the species does not feature these locations.

Ecology

According to Brown (1958b): “*Proceratium* ants nest consists of small rounded chambers hollowed out of soft rotten wood or in the soil; toward the cooler limits of the range, particularly in North America, nests

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Fig. 2: *Proceratium melinum* (Roger, 1860) - lateral view of worker (photo: S. Török)



Fig. 3-5: *Proceratium melinum* (Roger, 1860) worker from AntWeb (CASENT0907204), 3. head in full face view; 4. lateral view; 5. dorsal view



Fig. 6: *Proceratium melinum* (Roger, 1860) - lateral view of queen (photo: S. Török).

and foraging workers are found under deepest site is usually in forest shade, in old moist gardens, or similar habitats that are constantly moist”.

We collected the ants from an agricultural field, which is located near the swamp habitats of the reserve. In the spring the fields are usually flooded. Our collection in this habitat is consistent with Brown (1958b). Moreover, most of the published records are in agreement with the species humidity requirements due to frequently sampling from wet habitats (e.g. river valleys).

Additionally, Masuko (1986), Baroni Urbani and de Andrade (2003) observed a form of vampirism (e.g. the queens drinking the haemolymph of the larvae) in the species *P. japonicum*, *P. itoi*, and *P. watasei* and other hypogaeic ants. Due to the close phylogenetic

relationships with the latter species, *P. melinum* may exhibit similar behavior (Baroni Urbani and de Andrade, 2003). This bizarre form of non-destructive cannibalism could be regarded as an adaptation related to the lack of social food transfer (Masuko, 1986).

In conclusion, we believe the use of varied collecting methods including methods specific for cryptic species (Wilkie et al. 2007; Schmidt and Solar, 2010) would improve both occurrence and distribution information for ants in Romania. Additionally, investigating the habitat specificity of *P. melinum* would define this ant’s local distribution. And finally, this collection raises some interesting questions concerning the ecology of *P. melinum* which may increase our understanding of the relationships within this genus.

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Table-1: Supplementary material: List of the published records of *Proceratium melinum* (*- not shown in map).**

Country	Sites	Source
Albania	Vlora	Baroni Urbani and de Andrade, 2003
Albania	Tirana	Baroni Urbani and de Andrade, 2003
Austria	Neustift	Dietrich, 2004
Austria	Illmitz	Dietrich, 2004
Austria	Sankt Pölten	Dietrich, 2004
Austria	Graz	Dietrich, 2004
Austria	Freinberg	Dietrich, 2004
Austria	Steyregg	Dietrich, 2004
Austria	Purgstall	Dietrich, 2004
Bulgaria	Dobrudzha	Lapeva-Gjonova et al., 2010
Bulgaria	Svilengrad	Lapeva-Gjonova et al., 2010
Bulgaria	Burgas	Lapeva-Gjonova et al., 2010
Croatia	Krapina	Csősz, 2003
Croatia	Konavle	Bračko, 2006
Czech Republic	Moravia	Werner and Wiezik, 2007
Czech Republic	Brno	Werner and Wiezik, 2007
Czech Republic	Kremsier	Baroni Urbani and de Andrade, 2003
France	***Pirines	Casevitz-Weulersse and Galkowski, 2009
Greece	Dodecanese	Borowiec and Salata, 2012
Greece	Cephalonia, Sami	Baroni Urbani and de Andrade, 2003
Greece	Valsamata	Baroni Urbani and de Andrade, 2003
Greece	Argostoli	Baroni Urbani and de Andrade, 2003
Greece	Lakonia, Sparta	Baroni Urbani and de Andrade, 2003
Greece	Ithaki, Anoghi	Baroni Urbani and de Andrade, 2003
Greece	Zante	Baroni Urbani and de Andrade, 2003
Greece	Vasilikon	Baroni Urbani and de Andrade, 2003
Greece	Achaia, Kastritsion	Baroni Urbani and de Andrade, 2003
Greece	Messe, Analipois	Baroni Urbani and de Andrade, 2003
Greece	Ionians	Borowiec and Salata, 2012
Greece	Rhodes, Profitis Ilias	Baroni Urbani and de Andrade, 2003
Greece	Peloponnese	Borowiec and Salata, 2012
Greece	Stereia Ella	Borowiec and Salata, 2012
Greece	Corfu	Baroni Urbani and de Andrade, 2003
Hungary	Kiskunhalas	Csősz, 2003
Hungary	Révfülöp	Csősz, 2003
Hungary	Gyula	Csősz, 2003
Israel	Golan Heights	Vonshak and Ionescu, 2009
Italy	Bressanone	Baroni Urbani and de Andrade, 2003

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Italy	Emilia, Castelvetro	Baroni Urbani and de Andrade, 2003
Italy	Triest	Baroni Urbani and de Andrade, 2003
Italy	Coazze	Baroni Urbani and de Andrade, 2003
Italy	Hermada-Duino	Baroni Urbani and de Andrade, 2003
Italy	Bardolino, Verona	Baroni Urbani and de Andrade, 2003
Macedonia	Kos Hill, Demir Kapija	Karaman, 2009
Malta	Birkirkara	Schembri and Collingwood, 1981
Malta	Chadwick	Schembri and Collingwood, 1981
Montenegro	Castelnuovo –Herceg-Novi	Baroni Urbani and de Andrade, 2003
Romania	Comana Vlască	Montandon and Santschi, 1910
Romania	Bucharest	Lomnicki, 1922
Romania	Satchinez	New record
Russia	***don steppe	Baroni Urbani and de Andrade, 2003
Slovenia	Skrilje	Bračko, 2007
Spain	Caceres	García et al., 2009
Spain	Castellon	Baroni Urbani and de Andrade, 2003
Spain	Granada	Baroni Urbani and de Andrade, 2003
Spain	Pontevedra	Baroni Urbani and de Andrade, 2003
Spain	Sevilla	García et al., 2009
Turkey	Adapazan-Pamukova	Kiran and Karaman, 2012
Turkey	Antarkya, Yoselkent	Kiran and Karaman, 2012
Turkey	Sakarya	Kiran and Karaman, 2012
Turkey	Bebek, Istanbul	Kiran and Karaman, 2012
Turkey	Hatay	Baroni Urbani and de Andrade, 2003
Ukraine	Korobotschkino, Kharkiv	Baroni Urbani and de Andrade, 2003

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